

REMARKS

Claims 10-14 have been canceled. Claims 1-9, 12, 13 and 15-21 stand withdrawn from consideration. New Claims 22-34 remain active in the present application.

Reconsideration is respectfully requested.

Applicants' representative wishes to thank Examiner Short for the helpful and courteous interview of March 23, 2004. As a result of the discussion it is believed that the issues in the case have been clarified and that the prosecution of the application has been materially advanced.

The present invention relates to a aliphatic polyester based composition.

Arrangement of Specification

The amendments to the pages of text of the specification add appropriate headings and subheadings. Support for the description in the drawings can be found on page 2 of the text and the examples. None of the added subject matter introduces new matter into the case. Entry of the amendments is respectfully requested.

Claim Amendments

Claims 10-14 have been canceled in favor of new claims 22-28. New Claims 29-34 are presented for consideration as basis for such is found in the original claims and on pages 3, 4, 8 and page 12, line 14 to page 13, line 8 of the text. Entry of the new claims into the record is respectfully requested.

Claim Rejection, 35 USC 112, 2nd Paragraph

The issue raised with respect to Claims 10, 11 and 14 is obviated by the cancellation of the claims in favor of new claims. Withdrawal of the rejection is respectfully requested.

Restriction Requirement

In view of the presentation of the claims led by a generic claim that is believed to be patentably distinguished over the cited and applied prior art, rejoinder of the subject matter of Claims 12 and 13 with the other process claims is respectfully requested.

Invention

As now claimed the present invention is directed to a process for preparation of a thermoplastic polyester composition by passing a thermoplastic aliphatic polyester into an extruder successively comprising a polymer loading zone, a melting zone, a homogenization zone, a reaction zone in which molten thermoplastic aliphatic polyester reacts with a radical generator employed in a quantity ranging from 0.01 to 0.2 % by wt based on the thermoplastic aliphatic polyester, and a discharge zone, wherein the temperature of the loading zone is $\leq 20^{\circ}\text{C}$, the temperature in the melting zone and in the homogenization zone is \geq the melting temperature of the polymer and \leq the temperature at which the half-life period of the radical generator is ten times greater than the dwell time of the material in each of said zones and the temperature of the reaction zone is \geq the temperature at which the half-life period of the radical generator is \leq the dwell time of the material in this zone, thereby producing an extrudate having an RMFI value ranging from 1.1 to 2.5, and then obtaining an extruded polyester material.

Prior Art Rejection

Claims 10 and 14 stand rejected based on 35 USC 102(b) or 35 USC 103(a) as anticipated by or rendered obvious over WO 95/18169. This ground of rejection is respectfully traversed.

Consistent with the discussion of the interview between the Examiner and applicants' representative, it is clear that the WO '169 document discloses the processing of a lactide polymer by the extrusion of the polymer from an extruder under conditions in which the polymer reacts with an organic peroxide that is combined with the polyester in the extruder. The amount of peroxide that is combined with the polyester, typically ranges from 0.01 to 3 % by wt as disclosed on page 4 of the reference. The reference, however, does not show or suggest a thermoplastic aliphatic polyester having a ratio of particular MFI values that must fall within the range of 1.1 to 2.5. This is an important factor in determining the patentability of the invention in view of the comments made by inventor Henri Wautier in the attached Declaration (37 CFR 1.132). In summary of these comments, a polyester product that is capable of being blown into a film must have a RMFI value within the range recited in the present claims. If the RMFI of a polyester is below 1.1 or above 2.5, a film prepared by blowing of the polyester can not be obtained, albeit for different reasons as stated.

Although the reference, as noted above, discloses the extrusion of polylactide from an extruder, there is no teaching or suggestion of an extruder device as now claimed for the extrusion of an aliphatic polyester. The present method claims, particularly Claim 22, defines the essentials of an extrusion device as disclosed on pages 12 and 13 of the text. As such the extruder must be comprised of, at the minimum, a polymer loading zone, a melting zone, a homogenization zone, a reaction zone in which molten thermoplastic aliphatic polyester reacts with a radical generator employed in a quantity ranging from 0.01 to 0.2 % by wt based on the thermoplastic aliphatic polyester, and a discharge zone. Further, the temperature of the loading zone is $\leq 20^{\circ}\text{C}$, the temperature in the melting zone and in the homogenization zone is \geq the melting temperature of the polymer and \leq the temperature at which the half-life period of the radical generator is ten times greater than the dwell time of the material in each of said zones and the temperature of the reaction zone is \geq the temperature at which the half-

life period of the radical generator is \leq the dwell time of the material in this zone, thereby producing an extrudate having an RMFI value ranging from 1.1 to 2.5. There is no teaching or suggestion of such an extruder in the '169 document, and therefore the outstanding rejection of the claims based on 35 USC 102 is believed obviated and withdrawal of the same is respectfully requested.

It should be noted that the description of the extruder and extrusion process on pages 12 and 13, particularly at page 12, lines 23-24 of the text states that each of the zones has a very specific function, with each being at a very specific temperature. Accordingly, the extruder device and the specific conditions of operation of each section of the device are important if the polyester product of the invention is to be achieved, that is, an aliphatic polyester product having the claimed ratio of MFI values of 1.1 to 2.5. Because the reference makes no comment about an extruder device as now claimed (Indeed where a device is mentioned such as in Example 2 there is no description of the details of construction of the extruder.) and because it contains no teaching or suggestion of a ratio of MFI values of a polyester product, the reference clearly fails to teach or suggest the invention as claimed.

An aspect of the Examiner's comments concerning the rejection of the present claims over the disclosure of the '169 reference is that the process of the reference is alleged to inherently" produce polyester compositions having RMFI values within the presently claimed range of 1.1 to 2.5. However, it must be observed that "169 clearly states at page 4, line 2 that "cross-linking of the polymer can be neglected, because no gel formation can be observed." Such an admission is a clear indication that the polylactide composition is not inherently the same as the present polymer product where the existence of some cross-linking is essential as required by the RMFI range of 1.1 to 2.5. Again, '169 is totally silent as to the parameter of RMFI. Clearly, the process of producing a polylactide as disclosed in the

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reference does not inherently result in the product having the stated RMFI range as produced by the present process.

In view of the comments above, the rejections based on both 102 and 103 are believed to fail and withdrawal of the same is respectfully requested.

It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon

A handwritten signature in black ink, appearing to read "FD Vastine". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

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Application No. 10/030,140
Declaration, 37 CFR 1.132

DOCKET NO: 223321US0



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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF

CLAEYS, IVAN ET AL

SERIAL NO: 10/030,140

FILED: APRIL 30, 2002

FOR THERMOPLASTIC ALIPHATIC
POLYESTER COMPOSITIONS,
PREPARATION METHOD AND USES
THEREOF

:
: EXAMINER: SHORT, P
:
: GROUP ART UNIT: 1712

DECLARATION, 37 CFR 1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Now comes Henri Wautier who declares and states that:

- 1) I am one of the inventors of the invention described in the above-identified application.
- 2) In 1971 I received the Ph D. in chemistry degree from University of Louvain la Neuve (Belgium)
- 3) Since 1986 I have been employed by SOLVAY where I have been engaged as a researcher in the study of reactive extrusion.
- 4) I have read the specification of the above-identified application as well as the content of the Office Action of February 11, 2004 and each of the references cited therein.
- 5) As to the matter of the RMFI value range of 1.1 to 2.5 of the present claims and its relevance to the matter of patentability of the invention, it must be observed that for many applications of the thermoplastic aliphatic polyesters, and in particular the manufacture of

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films by conventional methods for blowing films, polyester compositions that are used should have the correct melt strength and the correct hardening behavior under elongation (strain-hardening) properties.

An important characteristic of the polyester employed is a function of the melt viscosity of the polymer. Melt viscosity depends on the molecular weight of the polymer and consequently on the thermal stability of the melt during melt processing. Scission of polymer chains during melt processing implies a decrease in melt viscosity during processing that makes it impossible to blow the polymer into films. The WO 95/18168 reference that has been cited and applied against the present claims discloses the use of peroxides to reduce chain scission and to slow down decreases in molecular weight of the polymer and decreases in melt viscosity of the polymer.

Another important characteristic of the polymer is linked to the extent of branching of the polymer (cross-linking). That is, if the extent of branching of the polymer is non-existent, puncturing of the bubble of blown film will occur during the blowing of the film, which obviously means that a properly blown film can not be obtained. On the other hand, if the branching of the film is too great, no elongation of the film during blowing will occur and, in fact, hardening of the polymer could occur in the extruder device. Thus, because the Ratio Melt Flow Index (RMFI) of a polymer provides a way of estimating the extent of cross-linking of a polymer, the use of this parameter as a limitation of the present claims provides an important measure of the extent of cross-linking of the polyester product produced by the process of the present invention. Accordingly, with respect to the RMFI value range of the present claims:

if the RMFI value is less than 1.1, branching of the polyester is essentially non-existent. In this instance, the blowing of a polyester into a film can not

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be performed because of puncturing of the bubble of film during blowing (see Comp Exs. 2, 4, 6 and 8).

if the RMFI value ranges from 1.1 to 2.5, the branching that exists in the polymer, while low, is nevertheless not non-existent and films can be made because of bubble stability during the blowing process (see Table 1, Examples 1, 3, 5 and 7).

if the RMFI value is above 2.5, no film can be made because of the impossibility of elongating the polymer during blowing of the same into a film.

6) I therefore submit that the RMFI range recited in the present process claims as a defining characteristic of the extruded product produced by the present process is critical in defining a polyester that can be blown into a film having the desired characteristics.

7) The undersigned petitioners declare further that all statements made herein of their own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

8) Further, deponent saith not.

May 04, 2004
Date

Heena Wauter
Signature